Serial No.: 10/077,010
Atty. Docket No.: JENES-1003

REMARKS

The foregoing preliminary amendment is directed to correcting a number of typographical errors in the application and to improve its clarity and accuracy of expression. A paragraph formally presented at the end of the "Description of the Problem" section of the application has been moved, with some changes, to the Summary section. No new matter is believed introduced by the amendments. Claims 1, 27 and 33 have been amended. Claims 1-36 remain active. A proposed drawing change, relating to Fig. 5 is presented to eliminate a duplicate number.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "Version with Markings to Show Changes Made".

Respectfully submitted,

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Date: 14 February 2003
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Exhibit I

Version with Markings to Show Changes Made

IN THE SPECIFICATION:

Please replace the following paragraphs as indicated.

The paragraph beginning on page 1, at line 9:

The present invention relates to low intensity level luminairies, particularly for use marking the location of doorbell buttons, driveway edges and the like, and more particularly [relates] relating to a battery powered luminaire providing a useful battery life of one or more years.

The paragraph beginning on page 1, at line 15:

Since the introduction of wireless doorbells, customers have requested a lighted button feature to assist in locating the doorbell button in the dark. Lacking connection to line electrical power, providing such a feature has proven impractical to achieve with even the smallest incandescent sources[,]. [since the] The power demands of incandescent bulbs exhaust the capacity of typical battery sizes usable in these products within hours, or days, at best. Larger batteries could increase [incandescent] battery life, but these are costly and their bulk is not appropriate in the application of a doorbell button. Early, non-high intensity type, LED light sources, while operable for far longer periods than incandescent sources, still cannot operate at the very low current levels required to obtain desirable battery life objectives of one year or longer [and still emit] while emitting useful levels of light.

The paragraph beginning on page 2, at line 1.

Battery life can [also] be extended for an LED device by causing the LED to

blink on and off. This can also serve to attract attention to the device. For a residential application however, most consumers do not want to have a blinking [red] LED marking their doorbell, driveway, or sidewalk. Operating the [red] LED on a continuous basis may be more attractive to consumers, but would require substantially more power.

The paragraph beginning on page 2, at line 7.

Reflector based markers and some types of landscape lights could also benefit from a long life battery powered luminaire. Roadside, bicycle and driveway reflector products are very effective when a bright source <u>of</u> light shines directly on them. Otherwise, such reflectors are ineffective. A self-lighted marker has the advantage of being visible without an external source of light directed on it, so that it is visible to walkers, joggers and bicyclists at night. [It is] <u>Such a marker would</u> also <u>be</u> useful in driving situations where the [location marked would be] <u>marker is</u> outside the normal field of <u>the car's</u> headlights. Roadside reflectors have been proposed that have made use of solar charging systems for batteries. Rechargeable batteries [can be] <u>are</u> bulky [though] and the solar cells and recharging circuits can add substantially to the relative cost of the product. Solar cells must be placed in locations that receive direct sunlight during some part of the day, and, as a consequence, may not work in <u>a shaded</u> [the desired] location[, such as the side of a house facing away from direct sunlight or on a shaded porch]. During winter at high latitudes very little sunlight is received, reducing the effectiveness of these products.

The paragraph beginning at page 2, on line 20.

Under conditions of darkness, it does not require much light output to make an object visible. The human eye has great light intensity adaptability. The differences in eye sensitivity between conditions of bright sunlight (photopic vision) and fully night adapted vision (scotopic vision) can vary by a factor of 25,000 and instances of adaptation up to a factor of 1,000,000 times [has] <u>have</u> been documented. Multiple mechanisms within the eye provide this

adaptability, some responding quickly to changing light conditions, e.g. pupil dilation, and some slowly, e.g. maximum rod sensitivity, so that fully night adapted vision is not achieved for up to 30 minutes. The implication of this is that levels of light[,] useless under normal indoor lighting conditions, can become useful under conditions where one can anticipate people will have adapted to darkened conditions. The spectrum of light generated makes a difference [to] <u>in</u> the minimum <u>radient intensity</u> [output in lumens] required for human perception. Generally people can see broad spectrum or white light more readily than they can see [red or violet] <u>narrow spectrum</u> light <u>of the same intensity</u>.

The paragraph beginning on page 3, at line 1.

Visible spectrum applications of light emitting diodes have long included simple status indicators and dynamic power level bar graphs. Display applications have grown in number and super bright LEDs are used in various automotive and traffic signal applications. Super bright LEDs are extremely efficient in terms of the percentage of input power converted to visible radiation compared with devices previously known. This is one reason they are favored for applications requiring the output of high intensity light. Super bright LED devices are available which emit any one of a variety of colors, or which emit broad spectrum radiation. Some super bright LEDs also work over broad ranges of drive currents and emit low intensity light at low drive currents and with low power consumption. These LEDs [can] exhibit efficiencies at [these] <u>low</u> power levels comparable to the high efficiencies achieved at the much higher power levels at which they are [normally intended] <u>designed</u> to operate. United States Patent 6,140,776 to Rachwal teaches a flashlight that exploits [this property] <u>low power operation of super bright LEDs</u> in one application.

Delete the paragraph beginning on page 3, at line 14.

[The terms white light and broad spectrum radiation are used broadly in this patent. Ideally, the present invention would apply LEDs which emit a spectrum blend of visible light

optimized to produce a physiological response in a normal human eye at an absolute minimum intensity level. The terms are thus used in the sense of any spectrum output producing greater perceived brightness than monochrome radiation generated at the same energy level.]

The paragraph beginning on page 3, at line 22.

The invention provides a marker luminaire combining a super bright LED and a low energy drive circuit to promote long battery life. Such a luminaire comprises a housing and a lamp disposed in the housing capable of producing light visible to a partially darkness adapted human eye. A minimal current is selected to produce enough light to be seen at the desired distances. A light scattering element is optically associated with the lamp to make the marker light visible across a wide viewing angle and thereby indicate the location of the housing. [An electrical energization] The electrical drive circuit provides the minimal current to the lamp. The electrical drive circuit may further comprise a photosensitive element responsive to high and low ambient light conditions for cycling operation of the LED. A replaceable electrical power cell is positioned in the housing in the electrical [energization] drive circuit as a power source.

Add the following paragraph before the paragraph to page 4 before the paragraph beginning on page 4 at line 1.

The terms white light and broad spectrum radiation are used broadly in this patent. The present invention uses LEDs which emit a spectrum blend of visible light on an illuminated surface at a near minimum intensity level which produces a physiological response in a normal human eye. The terms white light and broad spectrum are thus used in the sense of any spectrum output producing greater perceived brightness than monochrome radiation generated at the same energy level.

The paragraph beginning on page 5, at line 9.

Due to the nature of the human eye, monochrome LEDs operating at the same efficiency as a broad spectrum or white light LED require substantially more current than do the broad spectrum LEDs to achieve the same perceived brightness level. Since contemporary monochrome super bright LEDs do not exhibit substantially greater efficiencies in light generation compared to broad spectrum LEDs, super bright white LEDs may be operated at a current which is small fraction of [their] <u>the</u> rated current for the diode, and at a lower current than a monochrome LED, and still provide a level of illumination useful as a marker for darkness adjusted vision. At the time this patent was written, broad spectrum LEDs are preferred for the marker applications described herein. However, [were] <u>should</u> technical developments [to] lead to monochrome or limited spectrum LEDs exhibiting much higher efficiencies than white LEDs, than such devices might also produce perceptible light at a lower current than a white LED and come to be preferred for many of these applications.

The paragraph beginning on page 5, at line 21.

A luminaire used for marking the location of an object need not be particularly bright under circumstances where it can be expected that a person looking for the object will have partially darkness adapted vision. Contemporary, super bright, white LEDs rated at 15 to 20 milliamps can be operated in ranges extending from just below 5 milliamps to a few microamps and produce perceptible light. Extraordinarily long battery life for a luminaire can be achieved at these current levels. [Endurance] <u>Battery life</u> can be further extended by turning the LEDs on and off based on the need for light. For example, an ambient light sensitive control circuit may be used to turn off the luminaire during daylight. Using the low-level white LED approach and a daylight sensor, it is possible to obtain battery life in the range of 1-3 years for some applications using typical small lithium coin cells.

The paragraph beginning on page 6, at line 31.

LED **22** is positioned very near, or partially within, and optically coupled to, a translucent ring **30**. When activated, either by the switch **18** or the CdS light sensor **24**, LED **22** emits light which is coupled into the ring **30** and produces a glow which surrounds push-button **20**. The translucent material of ring **30** scatters the light and distributes it throughout the ring, which is visible across a broad angle. At night, when the push-button **20** has not been pressed, the ring **30** glows at a low level [from] <u>from</u> light from the LED. A normal eye that has achieved some degree of night adaptation can readily see the ring **30** and identify the push-button **20**. Upon push-button **20** being pressed the ring glows at a second, substantially higher level, indicating that the device is operating.

Delete the paragraph beginning on page 9, at line 3.

[An advantage of the doorbell systems so far discussed is that they can be used on any chime system, including battery less systems, and is universally applicable. Retailers should prefer selling a universal product compared with differentiated products suitable only for certain doorbell systems.]

The paragraph beginning on page 11, at line 10.

Case **70** further includes a light reflecting surface positioned behind a translucent lens **84**, which in turn forms a substantial portion of the front of the case. LED **78** is positioned within case **70** above and just behind translucent lens **84**, but forward of light reflecting surface **82**. LED **78** is oriented to cast light downwardly both onto the light reflecting surface as well as directly on the translucent lens **84**. The pattern of light created by LED **78** is typically a cone with its point at the LED's tip that expands symmetrically about the LED's central axis in a direction away from the LED. Where the cone of light intersects the translucent lens **84**, the lens scatters the light causing the lens to glow and to become visible from a wide band of viewing angles relative to the case **70**. However, the glow is not of a uniform intensity since the translucent lens **84** has [an arcuate shape] <u>a curved surface</u> and [further because] various areas of

the lens are [differently spaced] <u>at different distances</u> from LED **78**. Much of the light emitted by LED **78** does not directly strike lens **84** and thus does not add directly to the brightness of the lens.

The paragraph beginning on page 13, on line 29.

When compared with landscape lights, the driveway marker lights of the present invention exhibit the advantage of being self-contained. As such, installation of the [lights] product is very simple. This is especially important because driveway markers are often located at points that are the most remote within the yard from a source of power. Compared with solar products which also eliminate the hassle of wiring installation, this product is not dependent on sunlight to recharge batteries, which is a severe limitation for solar technology and it is also less costly because there are no solar panels, nor rechargeable batteries.

<u>IN THE CLAIMS:</u>

Please amend claims 1, 27

1.(Amended) A marker luminaire comprising:

a housing having an exterior and an interior;

a light emitting diode located in the interior of the housing;

a light scattering element optically coupled with the light emitting diode and <u>having a visible surface open on</u> [communicating with] the exterior of the housing for transmitting light over a broad angle viewing area; and

a low level energization circuit operably connected to the light emitting diode for causing the light emitting diode to [luminesce] <u>illuminate the visible surface of the light scattering element</u> at a level below a useful threshold of human photopic vision and above a threshold of scotopic vision.

27.(Amended) A lamp comprising:

a housing;

a battery located in the housing;

a light emitting diode in the housing, the light emitting diode being of a type exhibiting high efficiency in light generation across a substantial drive current operating range and with increasing intensity as drive current increases, <u>including light emission levels</u> [and which emits light] above a threshold of darkness adapted human vision and below a threshold of useful photopic vision;

a light scattering element optically coupled to the light emitting diode for transmitting and scattering light from the light emitting diode outside the housing; and

diode drive circuitry connected to the battery to draw power therefrom and further connected to the light emitting diode to deliver drive currents <u>to the light emitting diode sufficient to illuminate the light scattering element</u> above the threshold of darkness adapted human vision but below the threshold of useful photopic vision

33.(Amended) A luminaire comprising:

a housing;

a light scattering illumination source capable of producing light visible to a partially darkness adapted human eye [at] in response to a minimal current, the light scattering illumination source being mounted with respect to the housing to mark the location of the housing, when illuminated, over a wide viewing angle; and

an electrical energization circuit [providing] supplying the minimal current to the [lamp] the light scattering illumination source.

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CERTIFICATE OF MAILING

I hereby certify that I caused this Amendment to be mailed to the Commission for Patents on or before 14 February 2003.

Date: 14 February 2003

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